

California High-Speed Train Project



TECHNICAL MEMORANDUM

Alternatives Analysis Methods For Project-Level EIR/EIS

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1.0 PURPOSE

1.1 Introduction

This memorandum serves as a guide to the regional teams in preparing California High-Speed Train (HST) project-level Alternatives Analysis (AA) Reports for sections of the HST system. The AA Reports will incorporate the preliminary engineering information and will identify feasible and practicable alternatives to carry forward for environmental review and evaluation in Environmental Impact Reports/Environmental Impact Statements (EIR/EIS) for sections of the California HST Project (CHSTP). In developing the AA Reports the regional teams will begin analysis with the alternatives selected with the previously prepared statewide and Bay Area program EIRs/EISs. After identifying initial project alternatives; alignment plans, profiles, and sections will be developed and used for the preliminary evaluation of the alternatives. The AA evaluations will be used to assist the HSRA and the FRA in identifying the range of potentially feasible alternatives to analyze in the draft project EIR/EIS. The guidelines contained in this memorandum are designed to maintain consistency among the regional teams in identifying an appropriate range of alternatives to analyze in each EIR/EIS, conducting a preliminary analysis, applying evaluation criteria, and documenting the evaluation process, while still allowing flexibility to account for consideration of regional differences.

1.2 Applicability

The AA Reports are intended to provide the California High Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) with sufficient information and documentation to provide a clear understanding of the evaluation process used to identify and define a range of reasonable, practicable and feasible project alternatives. The Authority and the FRA expect to make the AA Reports available for public input. The alternatives evaluation will support decisions guiding the project design and environmental review process, including specifically the identification of a reasonable range of alternatives to be further considered in the project-level environmental analysis and the identification of alternatives that will not be studied in the EIR/EIS analysis. The Authority and the FRA will make these decisions, considering agency and public input. The AA reports will provide the basis for drafting the Alternatives Chapter in the Draft Project EIR/EIS.

This memorandum applies to the initial review and analysis process to be used by each of the regional teams in identifying the full range of HST project alternatives and station sites for preliminary review in order to support decisions determining the reasonable and feasible alternatives to carry forward for further engineering and environmental review. Each regional team is to use the engineering CAHST Basis of Design Technical Memo in their evaluation efforts, but will have flexibility if needed, to identify additional evaluation criteria that are specific to their region. This memorandum is consistent with the guidelines developed for the project environmental review phase, as defined by the CAHST Project Environmental Analysis Methodologies Report, and will help to ensure a consistent level of documentation of the analytic process for determining the range of alternatives to be analyzed in a project-level EIR/EIS.

1.3 OVERVIEW

Whereas the program EIR/EISs analyzed alternative corridors and station location alternatives, site-specific alignment and station alternatives will be developed for the project-level AA Reports. In the statewide program EIR/EIS, No Project, Modal, and HST Alternatives were considered. The Authority and FRA selected the HST Alternative and selected corridor alternatives and station location options for further analysis, and identified needs for HST system cleaning and maintenance facilities. The Bay Area to Central Valley HST Program

EIR/EIS supported Authority and FRA selection of corridor alternatives and station location options for further analysis in the Bay Area and Central Valley regions. The program-level environmental reviews were integrated with early steps in the Clean Water Act Section 404 alternatives analysis process.

The evaluation conducted for each of the AA reports will be based on preliminary alignments and will reflect a level of detail that considers preliminary project features at a 2% to 4% engineering design, but does not focus on the details of design. The analysis of alternatives will take into account previous work conducted for the Program EIRs/EISs. In addition, each of the regional teams will consider public and agency comments in response to the project-level EIR/EIS scoping processes and direction from the Authority and FRA. Input during the agency involvement process will also be considered a key part of the alternatives analysis process to identify reasonable and feasible alternatives to carry forward for environmental review. The AA reports will fully document how each of the alternatives meets the Purpose and Need for the project, and how evaluation criteria was used to determine which alternatives would be carried forward for environmental analysis and which alternatives did not meet the evaluation criteria and were screened from further analysis.

After the AA Reports have been finalized and a set of reasonable and feasible alternatives have been identified, a separate report that provides a detailed definition of alternatives will be prepared to describe each of the alternatives carried forward for environmental review. This report, the Alternatives Definition Report, will describe all design features and assumptions for the alternatives to support environmental evaluation and preliminary engineering design to 15%.

1.4 Additional Information

Additional information and resources on HST system background, technical guidance, and evaluation criteria can be found in the following locations.

<http://www.cahighspeedrail.ca.gov/>

Final Program EIR/EIS, Volumes 1 through 3, August 2005; the Authority's Certification and Decision on the Final Program EIR/EIS (Resolution No. 05-01); FRA Record of Decision for California High-Speed Train System, November 18, 2005, including the Mitigation Monitoring and Reporting Plan, the Summary of Public Comments from CEQA Certification, and the Errata for the Final Program EIR/EIS.

Final Bay Area to Central Valley High-Speed Train Program EIR/EIS, Volumes 1 through 3, May 2008, including the Mitigation Monitoring and Reporting Plan, the Summary of Public Comments from CEQA Certification, and the Errata for the Final EIR/EIS; the Authority's Certification and Decision on the Final Program EIR/EIS (Resolution No. 08-01); and FRA Record of Decision, December 2, 2008.

<https://ww2.projectsolve2.com/eRoom/SFOF/CAHSRProgramMgmt>

http://www.fra.dot.gov/Downloads/RRdev/corridor_planning.pdf

2.0 LEVEL OF EFFORT

2.1 APPROACH

The AA Reports will document the initial process of defining and evaluating project alternatives for sections of the HST system. The process will begin with the alignment and station information provided in the relevant program EIR/EIS, which with additional information gathered by the section design team and information gathered during scoping will be used by the team to identify preliminary project alternatives. These alternatives will include alignment alternatives, station site alternatives, alternative sites for the cleaning, maintenance and storage

facilities, and power supply facility alternatives needed for the HST system section. As the Alternative Analysis process continues, the alternatives will be revised using CHSTP design criteria for trackwork geometries, civil and structures design, systems design, and train operations. The AA Reports are to provide sufficient detail to document the evaluation process used to identify reasonable and feasible project alternatives that would meet the Purpose and Need for the project and are consistent with the Basis of Design Report as well as to identify those alternatives where environmental issues (severe conflicts or constraints) or engineering challenges may justify dropping them from further analysis. The AA Reports are to provide comparative information and data that highlight and compare similarities and differences between alternatives by using project design criteria. Each Regional Team will evaluate preliminary design alternatives against existing conditions, project-related changes, applicable state and federal standards, environmental impact criterion, design criteria, construction and operating factors, to support identification and selection of the reasonable range of practicable and feasible alternatives for project environmental review.

The process will include the following steps:

1. Initial Project Alternatives – Using the selected program-level corridor alignments and station locations, develop site-specific project alternatives considering current contextual conditions and constraints as well as information gathered during the scoping process. It is essential to start with the selected program alternatives as these were identified as likely to contain the Least Environmentally Damaging Practicable Alternative (LEDPA) with concurrence by the U.S. Environmental Protection Agency and the U.S. Army Corps through the Clean Water Act Section 404 alternatives analysis process.
2. Initial Screening – Prepare an initial evaluation for each alternative based on project-level existing conditions, future development plans, and other environmental studies prepared within the study area to identify alternatives likely to have severe constraints, conflicts with existing conditions, or approved future development in the study area.
3. Compare alternatives that are similar and determine which are best to carry forward for further evaluation.
4. Assess Environmental and Right-of-Way Constraints - Using the project alternative evaluation measures presented in Section 4.2 of this memo prepare a comparative analysis of the alternatives.
5. Draft Alternatives Analysis Report – Develop a preliminary definition of the project alternatives using the Basis of Design Report and applicable Technical Memoranda.
6. Project Alternatives Workshop - Conduct a workshop with the Authority and FRA to discuss the Draft Alternatives Analysis Report, severe design constraints or conflicts, and environmental impacts and benefits for each alternative. Purpose of the workshop is to get direction from the Authority and FRA on further investigation of alternatives, and to discuss alternatives to be identified for no further analysis, evaluation conclusions, and material to present to the public.
7. Public & Agency Outreach - Present evaluation process for preliminary alternatives to environmental, local, and transportation agencies and public and private stakeholders for input.
8. Refine Preliminary Definition of Project Alternatives – Based on comments and input received from the Public Outreach revise the project alternatives, as needed.
9. Final Alternatives Analysis Report – Finalize the report and submit to the Authority and FRA for approval. The Final Alternatives Analysis Report will document the alternatives

to be carried forward through the environmental analysis process and alternatives not to receive further analysis.

2.2 COORDINATION

Each Regional Team will coordinate their efforts with the project management team (PMT), Authority and FRA. The AA reports will be initially reviewed by the PMT, revised and submitted to the Authority and FRA for their review and comment. In addition, each AA Report will contain a discussion of the coordination and consultation efforts related to alternatives analysis and opportunities for agency and public input in the process. Coordination among regional teams is required at shared project limits where the end points would connect at common stations (example: Union Station for Anaheim to LA and LA to Palmdale sections).

3.0 ASSESSMENT / ANALYSIS

3.1 ALTERNATIVES EVALUATION

The AA evaluation will be conducted using standardized criteria so that each of the alternatives can be compared with each other in an effort to identify feasible and reasonable alternatives and those that should be eliminated from further consideration due to environmental or engineering issues that would make approvals or implementation infeasible, that would not reduce or avoid adverse environmental impacts, that would not meet purpose and need and project objectives, or would not be feasible or practicable to construct. Each AA Report will assess an appropriate range of preliminary alignments and station sites using the evaluation measures discussed in Section 4.0; however, each of the regional teams will have the flexibility to weight evaluation criteria differently to reflect the relative importance of issues in their region. Each report will include a brief discussion that characterizes key constraints or concerns in the region and explains criteria weighting. Specific evaluation criteria to be used in addition to criteria listed in section 4.0 below must be discussed with and approved in advance by the PMT, Authority, and FRA. Applicable evaluation, discussion, and conclusions from the program EIRs/EISs should be incorporated as appropriate into the AA Reports.

3.2 SCOPE OF ANALYSIS

Whereas the Program EIR/EIS evaluated the potential impacts various system alternatives would have at a planning level of detail, the AA Reports will assess a range of preliminary project alignments, station sites and related facilities sites at a site-specific level of detail. The AA Reports will document literature review, database queries, and field reconnaissance and will include a discussion of potential environmental constraints related to short-term and long-term effects. Short-term impacts will include construction and implementation issues. Long-term impacts will consider the direct and indirect effects of construction and daily operations of the project. The AA Reports are to describe the physical effects of the alternatives as well as consistencies with federal, and state environmental standards and future planned development. The AA Reports are to describe a range of typical measures or engineering designs that could be considered to avoid, minimize, or mitigate potential impacts and an assessment of the reasonableness and feasibility of these measures. Appropriate measures and engineering designs to be considered should be identified first from the mitigation monitoring and reporting programs approved for the two Program EIR/EISs, and then should be further defined and refined to apply to the site-specific and regional issues.

4.0 EVALUATION MEASURES

4.1 CHSTP DESIGN OBJECTIVES

Project alternatives shall be evaluated using system performance criteria that address design differences and qualities. Alignment and station performance objectives and criteria are:

Objective	Criteria
Maximize ridership/revenue potential	Travel time Route length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operations and maintenance issues and costs

4.2 PRELIMINARY ALTERNATIVES ANALYSIS CRITERIA

In addition to the CHSTP objectives and criteria above, further measures to evaluate and compare the project alternatives have been described below. Where it is possible to quantify the effects, estimates are to be provided, and where it is not possible to quantify effects, qualitative evaluation should be provided.

- A. Land use supports transit use and is consistent with existing, adopted local, regional, and state plans, and is supported by existing or future growth areas as measured by:

Measurement	Method	Source
Development potential for Transit Oriented Development (TOD) within walking distance of station	Sites within 1/2-mile of station compare potential of different station sites; note location(s) with highest potential for TOD development	Regional and local planning documents and land use analysis and input from local planning agencies
Consistency with other planning efforts and adopted plans	Qualitative - General analysis of applicable planning and policy documents	Land use analysis and input from planning agencies

- B. Construction of the alternative is feasible in terms of engineering challenges and right-of-way constraints as measured by:

Measurement	Method	Source
Constructability, access for construction; within existing transportation ROW	Extent of feasible access to alignment for construction	Plans and maps

- C. Minimize disruption to neighborhoods and communities – extent to which an alternative minimizes right-of-way acquisitions, minimizes dividing an established community and minimizes conflicts with community resources as measured by:

Measurement	Method	Source
Displacements	Number of residences and businesses displaced, size of properties and magnitude of property value of displaced (ranked as least, most # displaced; # acres)	Identified using concept drawings and aerial photographs
Properties with Access Affected	Number of properties whose access would be permanently disrupted # properties disrupted by construction	Estimated off concept plans and aerial photographs
Local Traffic Effects around stations	Potential increase in traffic congestion or LOS at critical intersections	Existing traffic LOS from local jurisdictions

- D. Minimize impacts to environmental resources – extent to which an alternative minimizes impacts on natural resources as measured by:

Measurement	Method	Source
Waterways and wetlands and nature preserves or biologically sensitive habitat areas affected	Number of new bridge crossings required; rough estimate of acres of wetlands, linear feet of waterways; acres and species of T&E habitat affected; acres of natural areas affected	Measured off concept plans and GIS layers; Section 404(b)1 analysis
Cultural resources	Number and type of historic architectural properties and archaeological sites directly impacted	Based on concept plans and GIS layers; Section 4(f) studies and cultural resource records search and surveys
Parklands	Number and acres of wildlife refuges and parks directly and indirectly affected	Based on concept plans and GIS layers; Section 4(f) studies.
Agricultural lands	Acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance	Based on concept plans and GIS layers

E. Extent to which an alternative minimizes impacts on the natural environment as measured by:

Measurement	Method	Source
Noise/Vibration effects on sensitive receivers	Number of and types of receivers with projected noise levels and vibration levels above FRA impact threshold	Results of screening level assessment; inventory of potential receivers from site survey and aerial maps
Change in visual / scenic resources	Number of view corridors and scenic/visual resources affected; extent of elevated structures in scenic areas and shadows on sensitive resources (parks)	Results of general assessment; survey of alignment corridors and planning documents from local and regional agencies
Maximize avoidance of areas with geologic and soils constraints	Soils/slope constraints Seismic constraints (proximity to earthquake zones)	USGS maps
Maximize avoidance of areas with potential hazardous materials	Hazardous materials/waste constraints	Data from records search of hazardous materials locations and generators.

5.0 DOCUMENTATION

5.1 LEVEL OF IMPACT

Each preliminary alternative should be evaluated individually under each objective and criterion at a preliminary level of analysis sufficient to identify potentially severe constraints and to provide an overall comparative analysis of the potential 'levels of impact' for the alternatives in a summary format. This information is expected to support determination of the feasible alternatives to be analyzed in the Draft Project EIR/EIS and the alternatives dismissed from further consideration. Starting with the Authority's adopted program-level Mitigation Monitoring and Reporting Plans, the Regional Team should identify practical mitigation measures, design considerations or avoidance techniques to address ways to minimize or avoid potentially significant impacts for consideration in the EIR/EIS. The measures should illustrate a general approach versus describing specific mitigation measures which would be addressed in the EIR/EIS. The measures should account for cause, effect, resolution and follow an "if this", "then that" format. Consideration should be given to estimated costs and likely ability to mitigate different ROW and environmental impacts.

5.2 ALTERNATIVES COMPARISON

The primary purpose of the AA Reports is to clearly describe the relative differences between preliminary alternatives based on a consistent set of evaluation criteria applied to each alternative. The AA Reports will summarize the attributes, potential design issues and environmental impacts and benefits for each alternative in matrix format. Alternatives identified to be dropped from further analysis should be included in the matrix and reasons for dropping the alternative should be described in the summary.

6.0 REFERENCES

6.1 INFORMATION FOR INCLUSION

All references will follow the format guidelines provided for the CHSTP. All sources must be referenced, including text, data, graphics, base maps, etc. Full referencing is also required in the text of the document in a footnote at the end of the sourced text. For tables, references will be listed as sources at the bottom of the table. For graphics, references, including base mapping, will be listed as sources in the legend.